COMPLETE SET OF PENDING CLAIMS

1. (Amended) A system for processing a workpiece, comprising:

a plurality of workpiece processors, with at least one of the workpiece processors comprising:

an upper rotor having a through air flow opening with a diameter which is about from 20 to 80% of the diameter of the workpiece;

a lower rotor engageable to the upper rotor to form a workpiece processing chamber; and

a robot moveable between the workpiece processors for loading and unloading a workpiece into and out of one or more processors.

2. (Cancelled)

3. (Original) The system of claim 1 further comprising an upper fluid applicator extending into the through opening in the upper rotor, to provide a processing fluid to an upper surface of the workpiece.

4. (Original) The system of claim 3 further comprising an actuator for moving the upper fluid applicator within the through opening for distributing a processing fluid to different portions of the workpiece.

5. (Original) The system of claim 4 wherein the upper fluid applicator comprises a nozzle having a collection section for collecting processing fluid when fluid delivery to the upper nozzle is discontinued so that excess processing fluid does not drip from the upper nozzle into the processing chamber.

6. (Original) The system of claim 1 further comprising a lower fluid applicator extending through the lower rotor for introducing a processing fluid to a lower surface of a workpiece.

7. (Original) The system of claim 1 further comprising a plurality of spacing members for holding a workpiece between the upper and lower rotor members.

8. (Original) The system of claim 1 further comprising a spin motor linked to the lower rotor.

9. (Original) The system of claim 8 wherein the spin motor has a maximum rotational velocity of approximately 4000 rpm.

10. (Original) The system of claim 8 wherein the spin motor accelerates from 0 to 1800 rpm in approximately 2 to 4 seconds.

11. (Original) The apparatus of claim 1 further comprising magnet means for engaging the upper and lower rotors.

12. (Original) The system of claim 1 further comprising a sump at a central area of the lower rotor.

13. (Original) The system of claim 1 further comprising a moveable drain assembly including a plurality of drain paths, with each drain path separately alignable with the processing chamber by vertically moving the drain assembly.

14. (Original) The system of claim 1 further comprising an air supply line in communication with the processing chamber and having an inlet located vertically above the processing chamber for delivering clean air into the processing chamber.

15. (Original) A system for processing a workpiece, comprising:

a plurality of workpiece processors, with at least one of the workpiece processors comprising:

an upper rotor;

a lower rotor engageable with the upper rotor to form a workpiece processing chamber;

a robot moveable between the processors for loading and unloading workpieces into and out of the processors; and

a moveable drain assembly including a plurality of separate drain paths, with each drain path separately alignable with the processing chamber by moving the drain mechanism to align a single drain path with the processing chamber.

16. (Original) The system of claim 15 wherein the lower rotor is at a fixed vertical position, and the upper rotor and the drain assembly are moveable vertically, relative to the lower rotor.

17. (Original) The system of claim 15 wherein the upper rotor has a central through opening for air flow having a diameter of 20-80% of the diameter of the workpiece.

18. (Original) The system of claim 15 further comprising a nozzle extending into the upper rotor for introducing a processing fluid to an upper surface of a workpiece.

19. (Original) The system of claim 15 further comprising a loading station, with the robot moveable from the loading station to one or more of the workpiece processors.

20. (Original) The system of claim 15 wherein the workpiece processors are arranged in a first row and a second row, with the robot moveable between the two rows.

21. (Original) A system for processing a workpiece, comprising:

a plurality of workpiece processors, with at least one of the workpiece processors comprising:

an upper rotor having a first magnetic element;

a lower rotor having a second magnetic element, with the upper rotor engageable to the lower rotor via interaction of the magnetic elements, to form a workpiece processing chamber; and

a robot moveable between the workpiece processors for loading and unloading a workpiece into and out of one or more processors.

22. (Original) The system of claim 21 with the upper rotor having a through opening with a diameter which is 20-80% of the diameter of the workpiece.

23. (Original) The system of claim 21 further comprising an upper fluid applicator extending into the through opening in the upper rotor, to provide a processing fluid to an upper surface of the workpiece.

24. (Original) The system of claim 21 further comprising an actuator for moving the upper fluid applicator within the through opening for distributing a processing fluid to different portions of the workpiece, and for moving the upper fluid applicator vertically and radially out of the processing chamber.

25. (Original) The system of claim 21 further comprising a lower fluid applicator extending through the lower rotor for introducing a processing fluid to a lower surface of a workpiece.

26. (Original) The system of claim 21 further comprising a moveable drain assembly including a plurality of drain paths, with each drain path separately alignable with the processing chamber by vertically moving the drain assembly.

27. (Original) A system for processing a workpiece, comprising:

a plurality of workpiece processors, with at least one of the workpiece processors comprising:

a first rotor;

a second rotor

engagement means for engaging the first rotor to the second rotor, without the need for physical contact with the first rotor; and

loading means for loading a workpiece into and out of one or more of the processors.

28. (Original) The system of claim 27 wherein the engagement means comprises elements for creating magnetic repulsion or attraction between the first and second rotors.

29. (Original) The system of claim 27 further comprising drain means for separately draining fluids from the processing chamber.

30. (Original) A method of processing a workpiece, comprising the steps of:

placing the workpiece into a first rotor;

engaging a second rotor to the first rotor via a non-contact force, to form a processing chamber around the workpiece;

spinning the first and second rotors; and

applying a first processing fluid to a first side of the workpiece, with the first processing fluid flowing radially outwardly over the first side of the workpiece via centrifugal force.

31. (Original) The method of claim 30 further comprising the step of removing the first processing fluid from the processing chamber via a first drain path located in a moveable drain mechanism in communication with the processing chamber.

32. (Original) The method of claim 30 wherein the non-contact force comprises magnetic force.

33. (Original) A system for processing a workpiece, comprising:

a plurality of workpiece processors, with at least one of the workpiece processors comprising:

an upper rotor;

a lower rotor engageable to the upper rotor to form a workpiece processing chamber;

a moveable drain assembly alignable with the processing chamber, the drain assembly separated from the processing chamber by a gap in which a downward airflow is created when the drain assembly is lowered and/or the upper rotor is raised; and

a robot moveable between the workpiece processors for loading and unloading a workpiece into and out of one or more processors.

34. (Original) The system of claim 33 wherein the gap is 0.125 to 0.250 inches wide.

35. (Previously presented) A workpiece processor, comprising:

an upper rotor having a through air flow opening;

a lower rotor engageable to the upper rotor to form a workpiece processing chamber;

wherein the through air flow opening in the upper rotor has a diameter which is 20-80% of the diameter of the workpiece.

36. (Previously presented) The processor of claim 35 further comprising an upper fluid applicator extending into the through opening in the upper rotor, to provide a processing fluid to an upper surface of the workpiece.

37. (Previously presented) The processor of claim 36 further comprising an actuator for moving the upper fluid applicator within the through opening.

38. (Previously presented) The processor of claim 36 wherein the upper fluid applicator comprises a nozzle having a collection section for collecting processing fluid when fluid delivery to the upper nozzle is discontinued so that excess processing fluid does not drip from the upper nozzle into the processing chamber.

39. (Previously presented) The processor of claim 35 further comprising a lower fluid applicator extending through the lower rotor for introducing a processing fluid to a lower surface of a workpiece.

40. (Previously presented) The processor of claim 35 further comprising one or more magnets for engaging the upper and lower rotors.

41. (Previously presented) The processor of claim 35 further comprising a moveable drain assembly including a plurality of drain paths, with each drain path separately alignable with the processing chamber by vertically moving the drain assembly.

42. (Previously presented) A workpiece processor, comprising:

an upper rotor having a first magnetic element;

a lower rotor having a second magnetic element, with the upper rotor engageable to the lower rotor via interaction of the magnetic elements, to form a workpiece processing chamber; and

fluid inlet extending into the processing chamber to provide a processing fluid onto a workpiece in the processing chamber.

43. (New) A system for processing a workpiece, comprising:

a plurality of workpiece processors, with at least one of the workpiece processors comprising:

an upper rotor having an opening with an area of about 4% to 64% of the area of the workpiece;

a lower rotor engageable to the upper rotor to form a workpiece processing chamber; and

a robot moveable between the workpiece processors for loading and unloading a workpiece into and out of one or more processors.

44. (New) A system for processing a workpiece, comprising:

a plurality of workpiece processors, with at least one of the workpiece processors comprising:

an upper rotor having a through opening;

a lower rotor engageable to the upper rotor to form a workpiece processing chamber;

a spin motor linked to the lower rotor; and

a robot moveable between the workpiece processors for loading and unloading a workpiece into and out of one or more processors.

45. (New) A system for processing a workpiece, comprising:

a plurality of workpiece processors, with at least one of the workpiece processors comprising:

an upper rotor having a through opening;

a lower rotor engageable to the upper rotor to form a workpiece processing chamber;

a sump at a central area of the lower rotor; and

a robot moveable between the workpiece processors for loading and unloading a workpiece into and out of one or more processors.

46. (New) The system of claim 45 wherein the area of the opening is from about 4% to 64% of the area of the workpiece.

47. (New) A system for processing a workpiece, comprising:

a plurality of workpiece processors, with at least one of the workpiece processors comprising:

an upper rotor having a through air flow opening;

a lower rotor engageable to the upper rotor to form a workpiece processing chamber;

an air supply line in communication with the processing chamber and having an inlet located vertically above the processing chamber for delivering clean air into the processing chamber; and

a robot moveable between the workpiece processors for loading and unloading a workpiece into and out of one or more processors.

48. (New) A system for processing a workpiece, comprising:

a plurality of workpiece processors, with at least one of the workpiece processors comprising:

a first rotor;

a second rotor

engagement means for engaging the first rotor to the second rotor, without the need for physical contact with the first rotor, with the engagement means including elements for creating magnetic repulsion or attraction force on a rotor; and

loading means for loading a workpiece into and out of one or more of the processors.

49. (New) A system for processing a workpiece, comprising:

a plurality of workpiece processors, with at least one of the workpiece processors comprising:

a first rotor;

a second rotor

engagement means for engaging the first rotor to the second rotor, without the need for physical contact with the first rotor;

drain means for separately draining fluids from the processing chamber; and

loading means for loading a workpiece into and out of one or more of the processors.

50. (New) The system of claim 49 wherein the engagement means comprises elements for creating magnetic repulsion or attraction on the first or second rotor.

51. (New) A workpiece processor, comprising:

a base housing;

a base magnet on the base housing;

a first rotor rotatable within the base housing;

a second rotor adapted to engage and form a processing chamber with the first rotor;

a rotor magnet on the first rotor, with the rotor magnet repelled by the base magnet.

52. (New) The system of claim 51 further comprising means for spinning the first rotor, with the first rotor making no physical contact with the housing while spinning.

53. (New) The system of claim 51 where the base magnet, or the rotor magnet, or both, comprise a magnet ring.

54. (New) A workpiece processor, comprising:

a fixed, non-rotating housing;

at least one housing magnet on the housing;

a first rotor rotatable within the housing;

at least one rotor magnet on the first rotor;

a second rotor engageable with the first rotor;

and with first rotor biased away from the housing via the rotor magnet repelling the housing magnet.

55. (New) The workpiece processor of claim 54 with the first rotor suspendable within the housing via interaction between the housing magnet and the rotor magnet.

56. (New) The workpiece processor of claim 54 further comprising a through air flow opening in the second rotor, with the through air flow opening having a diameter of from about 20-80% of the diameter of the workpiece.

57. (New) The workpiece processor of claim 54 further comprising a fluid applicator extendible through the through air flow opening in the second rotor.

58. (New) The workpiece processor of claim 54 further comprising a drain assembly vertically moveable relative the first rotor.

59. (New) A workpiece processor, comprising:

an upper rotor having a through air flow opening with a diameter which is about from 20 to 80% of the diameter of the workpiece; and

a lower rotor engageable to the upper rotor to form a workpiece processing chamber.

60. (New) The processor of claim 59 further comprising an upper fluid applicator extending into the through opening in the upper rotor, to provide a processing fluid to an upper surface of a workpiece in the processing chamber.

61. (New) The processor of claim 60 further comprising an actuator for moving the upper fluid applicator within the through opening for distributing a processing fluid to different portions of the workpiece.

62. (New) The processor of claim 60 wherein the upper fluid applicator comprises a nozzle having a collection section for collecting processing fluid when fluid delivery to the upper nozzle is discontinued so that excess processing fluid does not drip from the upper nozzle into the processing chamber.

63. (New) The processor of claim 59 further comprising a lower fluid applicator extending through the lower rotor for introducing a processing fluid to a lower surface of a workpiece in the processing chamber.

64. (New) The processor of claim 59 further comprising a spin motor linked to the lower rotor.

65. (New) The processor of claim 59 further comprising magnet means for engaging the upper and lower rotors.

66. (New) The processor of claim 59 further comprising a sump at a central area of the lower rotor.

67. (New) The processor of claim 59 further comprising a moveable drain assembly including a plurality of drain paths, with each drain path separately alignable with the processing chamber by vertically moving the drain assembly.

68. (New) A workpiece processor, comprising:

an upper rotor;

a lower rotor engageable with the upper rotor to form a workpiece processing chamber; and

a moveable drain assembly including a plurality of separate drain paths, with each drain path separately alignable with the processing chamber by moving the drain mechanism to align a single drain path with the processing chamber.

69. (New) The processor of claim 68 wherein the lower rotor is at a fixed vertical position, and the drain assembly is moveable vertically, relative to the lower rotor.

70. (New) The system of claim 68 wherein the upper rotor has a central through opening for air flow having a diameter of 20-80% of the diameter of the workpiece.

71. (New) A workpiece processor, comprising:

an upper rotor having a first magnetic element;

a lower rotor having a second magnetic element, with the upper rotor engageable to the lower rotor via interaction of the magnetic elements, to form a workpiece processing chamber.

72. (New) The processor of claim 71 with the processing chamber adapted for processing a workpiece having a specific diameter, and with the upper rotor having a through opening with a diameter which is 20-80% of the diameter of the workpiece.

73. (New) The processor of claim 71 further comprising an upper fluid applicator extending into the through opening in the upper rotor, to provide a processing fluid to an upper surface of the workpiece.

74. (New) The processor of claim 71 further comprising an actuator for moving the upper fluid applicator within the through opening for distributing a processing fluid to different portions of the workpiece, and for moving the upper fluid applicator out of the processing chamber.

75. (New) The processor of claim 71 further comprising a lower fluid applicator extending through the lower rotor for introducing a processing fluid to a lower surface of a workpiece.

76. (New) The processor of claim 71 further comprising a moveable drain assembly including a plurality of drain paths, with each drain path separately alignable with the processing chamber by vertically moving the drain assembly.

77. (New) A workpiece processor, comprising:

a first rotor;

a second rotor; and

engagement means for engaging the first rotor to the second rotor, without the need for physical contact with the first rotor.

78. (New) The processor of claim 77 wherein the engagement means comprises elements for creating magnetic repulsion or attraction between the first and second rotors.

79. (New) The processor of claim 77 further comprising drain means for separately draining fluids from the processing chamber.

80. (New) A workpiece processor, comprising:

an upper rotor:

a lower rotor engageable with the upper rotor to form a processing chamber;

an opening in the lower rotor; and

a snorkel having a first end vertically above the upper rotor, and having a second end leading to the opening in the lower rotor.

81. (New) The processor of claim 80 further comprising a nozzle arranged to spray a process liquid through the opening in the lower rotor and onto a lower surface of a workpiece in the processing chamber, a tube connecting to the nozzle and to the second end of the snorkel, and a valve associated with the snorkel or the tube.

82. (New) A workpiece processor, comprising:

an upper rotor;

a lower rotor engageable with the upper rotor;

a sump section on the lower rotor; and

a nozzle extending up at least partially through the sump section.

83. (New) The processor of claim 82 wherein the sump section comprises a conical depression around the center of the lower rotor.